136

Santa Clara County Flood Control
and Water District

ANNUAL SURVEY REPORT
on
GROUND WATER CONDITIONS
1969

February 1969

GB
1025
S383.A6
v.1969
WATERSUP
GW-Local

GB1025S383A61969c.3

Santa Clara County Flood Control
and Water District

ANNUAL SURVEY REPORT
on
GROUND WATER CONDITIONS

1969

February 1969

santa clara county
FLOOD CONTROL AND WATER DISTRICT
DONALD K. CURRLIN GENERAL MANAGER

516 EAST MARTHA STREET
SAN JOSE, CALIF. 95112
DEPARTMENT OF ADMINISTRATION AND FINANCE 299-2031
CLERK OF THE BOARD 299-2031
ENGINEERING DEPT. 299-3841
PUBLIC SERVICE DEPT. 299-3841

February 11, 1969

The Board of Directors
Santa Clara County Flood
Control and Water District
516 East Martha Street
San Jose, California 95112

Gentlemen:

I am please to transmit to you the District Engineer's Annual Survey Report on Ground Water Conditions in the Santa Clara County Flood Control and Water District for 1969. The Report was prepared under the authority of Section 26.5 of the District Act and is the seventh of an annual series required as a prerequisite to the levy of the ground water charge on the production of water from the ground water supplies within a zone or zones of the District.

The reported investigation finds that the annual overdraft condition in the Santa Clara Valley Ground Water Basin has been eliminated and the accumulated overdraft has been reduced because of the increased importation of South Bay Aqueduct water. Overdraft conditions do not appear to exist in the Coyote and Llagas Ground Water Basins. The long-term accumulated overdraft in the Santa Clara Valley Ground Water Basin as of the end of the preceding (1967-68) water year was estimated to be 678,000 acre-feet, zero acre-feet for both the Coyote Ground Water Basin, and for the Llagas Ground Water Basin.

During 1967-68 about 63,000 acre-feet of imported water was delivered through the South Bay Aqueduct and the District's In-County Water Distribution System for use in the Santa Clara Valley Ground Water Basin. Of this amount, 8,150 acre-feet was processed through the District's Rinconada Water Treatment Plant and delivered to treated water customers. The remainder of this imported water was used to recharge the ground water basin except for 274 acre-feet delivered to the District's untreated water contractors. The District has requested delivery of 75,540 acre-feet of imported water in the current (1968-69) water year. No imported water was delivered to the Coyote and Llagas Ground Water Basins.

I concur with the findings presented in this report and recommend that they be adopted as the prerequisite to the levy of ground water charges for the fiscal year (1969-70) in the zones of the District.

Sincerely yours,

Donald K Currlin

General Manager

ANNUAL SURVEY REPORT
ON
GROUND WATER CONDITIONS

This is the seventh annual survey report on ground water conditions in the Santa Clara County Flood Control and Water District. This is a summary type report which follows the methodology as detailed in the 1967 and earlier reports, and summarizes the ground water conditions in the various ground water basins of the District during the preceding water year.

This report provides the information, required by Section 26.5 of the District Act, which serves as a basis for the determination by the District Board of Directors of the ground water charges for the ensuing water year, 1969-70.

There are three major interconnected ground water basins occupying 240,000 of the 849,000 acres in Santa Clara County. These three major basins are shown on Plate 1 and are the Santa Clara Valley, the Coyote, and the Llagas Ground Water Basins. At the prescribed time for filing this report the areas in which a ground water charge is levied by the District are Zones W-2, W-3.1, W-3.2 and W-3.3. The boundaries of Zone W-2 closely follow the boundaries of the Santa Clara Valley Ground Water Basin. The boundaries of Zones W-3.1, W-3.2, W-3.3 and W-3.4 are shown on Plate 1; all are in the Coyote Ground Water Basin.

Zones W-3, W-3.1, W-3.2, W-3.3 and W-3.4 are areas of benefit and were formed to provide revenue for local water conservation activities. These zones were required as a result of the merger of the Santa Clara County Flood Control and Water District and the Santa Clara Valley Water Conservation District in March 1968. In Zone W-3 an ad valorem tax is levied in lieu of a ground water charge; this Zone includes most of the Coyote Ground Water Basin and a portion of the Llagas Ground Water Basin.

Within any water year the essential elements of water supply to the ground water basins of the District are precipitation, surface and subsurface inflow and surface import. This water supply is disposed of by consumptive use, surface and subsurface outflow and export. The difference between the water supply and the disposal of water is the seasonal surplus or deficiency that causes the short term ground water table fluctuations as water is replaced or removed from storage. Utilizing information gathered by the District and cooperating agencies a mass balance of the seasonal elements of water supply and disposal for the ground water basins of the District has been prepared in conformance with the methods utilized in previous reports and reference is made to the 1967 report for a detailed description of these methods.

Table 1 lists the principal elements of water supply and disposal and indicates a 17,000 acre-foot surplus for the Santa Clara Valley Ground Water Basin, a 9,000 acre-foot deficit for the Coyote Ground Water Basin and a 38,000 acre-foot deficit for the Llagas Ground Water Basin during the

TABLE 1

SUMMATION OF THE ANNUAL ITEMS OF WATER SUPPLY & WATER DISPOSAL TO THE GROUND WATER BASINS OF THE DISTRICT FOR THE WATER YEAR 1967-68

Values in Acre-Feet

Item	Ground Water Basin			
	Santa Clara Valley	Coyote	Llagas	Total
Water Supply				
Precipitation	179,000	11,000	60,000	250,000
Stream & Surface Inflow	108,000	32,000	27,000	167,000
Subsurface Inflow	56,000	3,000	13,000	72,000
Import	*86,000	0	0	86,000
Subtotal	429,000	46,000	100,000	575,000
Water Disposal				
Consumptive Use	279,000	26,000	113,000	418,000
Stream Outflow	30,000	23,000	6,000	59,000
Subsurface Outflow	0	6,000	15,000	21,000
Export (sewage)	103,000	0	4,000	107,000
Subtotal	412,000	55,000	138,000	605,000
Water Supply-Water Disposal = Surplus (+) or Deficiency (-)	+17,000	- 9,000	-38,000	-30,000

* 63,000 acre-feet imported throuth the South Bay Aqueduct and 23,000 acre-feet through the Hetch-Hetchy Aqueduct.

1967-68 water year, a year of below average rainfall. The importation of a total of 86,000 acre-feet to the Santa Clara Valley Ground Water Basin through the South Bay and Hetch-Hetchy Aqueducts accounts for the surplus of 17,000 acre-feet in this basin for 1967-68.

The configuration of the ground water table in 1968 and the change in the ground water table from July 1967 to July 1968 for the three major ground water basins of the District are indicated by the contours shown on Plates 2 and 3 respectively. In the Santa Clara Valley Ground Water Basin these ground water table contours show local depressions resulting from concentrated withdrawals. Also extensive areas of recovery can be noted. This recovery results from an extensive localized recharge program utilizing both local conservation and imported water. The importation of water into the Santa Clara Valley Ground Water Basin resulted in a continuation of the 1966-67 recovery even though local water supplies in 1967-68 were below average.

As an independent check on the mass balance calculation of water supply and disposal, the change in ground water contours was planimetered and by use of appropriate storage coefficients a 22,000 acre-foot increase in storage was calculated. Similarly, calculations of the change in storage of the Coyote and Llagas Ground Water Basins, showed deficits of 12,000 and 36,000 acre-feet respectively. These values provide, within the precision of assumptions assignable to these computations, satisfactory checks on the mass balance calculations.

A large part of the ground water table in the Santa Clara Valley Ground Water Basin is below sea level and below levels that existed in 1942, considered to be a desirable level in this basin. The amount of water removed from storage since 1942 is defined as the accumulated overdraft and at the end of the 1967-68 water year this overdraft is calculated to be 678,000 acre-feet. This is a reduction of $\overset{?}{1}$7,000 acre-feet from that computed from the previous year and results primarily from an increase in imported water delivered to the basin through the South Bay Aqueduct.

In addition to the mining of ground water from this basin, a serious effect of this over drafted condition is a dewatering and compaction of the subsurface sediments in the northern and central portions of the Santa Clara Valley Ground Water Basin. Dependent on the location within the District this compaction has resulted in an average annual subsidence, over the period since 1960, ranging from 0.08 feet to 0.55 feet per year. As a result a 100 square mile area overlying the epicenter of compaction in the Santa Clara Valley Ground Water Basin has subsided more than 1 foot since 1960.

As defined in the District's Act the average annual overdraft is the amount of ground water equal to the average annual

TABLE 2

SUMMATION OF THE AVERAGE SEASONAL ITEMS OF WATER SUPPLY AND WATER DISPOSAL UNDER PRESENT CONDITIONS TO THE GROUND WATER BASINS OF THE DISTRICT

Values in Acre-Feet

Item	Ground Water Basin			Total
	Santa Clara Valley	Coyote	Llagas	
Water Supply				
Precipitation	214,000	15,000	101,000	330,000
Stream & Surface Inflow	160,000	68,000	58,000	286,000
Subsurface Inflow	19,000	3,000	12,000	34,000
Import	86,000	0	0	86,000
Subtotal	479,000	86,000	171,000	736,000
Water Disposal				
Consumptive Use	279,000	21,000	113,000	413,000
Stream Outflow	81,000	59,000	49,000	189,000
Subsurface Outflow	0	6,000	5,000	11,000
Export	103,000	0	4,000	107,000
Subtotal	463,000	86,000	171,000	720,000
Water Supply minus Water Disposal = Average Seasonal Overdraft (-) or Surplus (+)	+16,000	0	0	+16,000

decrease in the amount of ground water in storage that occurs during a long-term base hydrologic period under the particular set of physical conditions presently affecting the supply, use, and disposal of water in the ground water basins and the zones. To determine the average annual overdraft the long-term (1935-47 for the Santa Clara Valley and Coyote Ground Water Basins and 1932-47 for the Llagas Ground Water Basin) average amounts of natural water supply and disposal are compared with the previous year's (1967-68) values of import, export and consumptive use. This formulation indicates whether under present conditions a water supply overdraft exists. The results of these calculations are shown in Table 2 and indicate that there is a surplus condition of 16,000 acre-feet in the Santa Clara Valley Ground Water Basin and that no overdraft appears to exist in either the Coyote or Llagas Ground Water Basins.

Estimated seasonal ground water extractions for the preceding (1967-68), current (1968-69) and ensuing (1969-70) water years are summarized in Table 3. Values for the water year 1967-68 in the Santa Clara Valley Ground Water Basin are based on statements submitted by ground water users as a requirement of the District's ground water charge, whereas all other values are estimates based on assumed average year conditions and on estimates of irrigated agricultural acreage.

During the 1967-68 water year 62,920 acre-feet of South Bay Aqueduct water was imported. Of this amount 54,495 acre-

TABLE 3

ESTIMATED SEASONAL GROUND WATER EXTRACTIONS FROM THE GROUND WATER BASINS OF THE DISTRICT*

Values in Acre-Feet

Water Year and Use	Ground Water Basin			
	Zone W-2	Coyote	Llagas	Total
1967-68				
Agric. Use	40,000	13,000	63,000	116,000
Urban Use	117,000	2,000	11,000	130,000
Total	157,000	15,000	74,000	246,000
1968-69				
Agric. Use	33,000	9,000	44,000	86,000
Urban Use	104,000	2,000	10,000	116,000
Total	137,000	11,000	54,000	202,000
1969-70				
Agric. Use	32,000	9,000	44,000	85,000
Urban Use	100,000	2,000	11,000	113,000
Total	132,000	11,000	55,000	198,000

*Reported extractions are shown for Santa Clara Valley Ground Water Basin in 1967-68, all other values are based on estimates. Predicted values for 1968-69 and 1969-70 are based on average water supply year.

feet were delivered to percolation ponds for recharge into the Santa Clara Valley Ground Water Basin, and 8,151 acre-feet of imported water was treated at the District's Rinconada Water Treatment Plant and delivered to the consumer through retail water agencies. In addition, 274 acre-feet of imported raw water was delivered on the surface for irrigation. In the current water year (1968-69) 75,540 acre-feet of water is scheduled for delivery and in the ensuing (1969-70) water year a delivery of 79,800 acre-feet has been requested.

To pay the District's share of the water importation program, a county-wide ad valorem tax and a ground water charge for water extracted from the ground water basin of Zone W-2 or delivered on the surface in lieu of extractions was levied in the 1967-68 water year. The county-wide ad valorem tax was set at 5 cents per 100 dollars assessed valuation. The ground water charge in Zone W-2 was set at 5 dollars per acre-foot for water extracted for agricultural use and 16 dollars per acre-foot for water extracted for other than agricultural uses.

After the merger of the former Santa Clara Valley Water Conservation District and the Santa Clara County Flood Control and Water District in March 1968 new charges were assessed for the 1968-69 water year. The same 5 cents per 100 dollars assessed valuation ad valorem county-wide tax was assessed to help pay for the cost of the aqueducts bringing imported water

TABLE 4

INCOME & EXPENDITURES

Items	Preceding 1967-68 Water Year	Current 2/ 1968-69 Water Year	Ensuing 1969-70 Water Year
Income			
Taxes 1/	862,019	881,571	
Ground Water Charge	2,209,379	3,894,400	
Surface Water Charge	11,077	78,745	
Treated Water Charge	419,584	585,714	
Other	286,292	309,006	
Total	$3,788,351	$5,749,436	
Expenditures			
State			
Capital Cost	1,093,436	1,179,950	1,276,400
Fixed Oper. & Maint.	247,106	558,498	648,300
Vairable Oper. & Maint.	300,380	383,067	480,400
Water Charge	307,325	357,916	459,100
District			
Admin. & Water Use	175,333	242,724	317,000
Engineering	121,763	215,360	263,000
Operations	496,447	1,496,098	1,000,000
Bond Redemption			
Series A thru C	1,464,403	1,463,903	1,746,400
Series 3-7 3/		498,598	496,400
	$4,206,193	$6,396,114	$6,687,000

1/ Net taxes after rebate to areas using Hetch-Hetchy water.
2/ Items as budgeted in 1968 - final figures not available.
3/ Former Valley Conservation District bonds.

to the District. The ground water charge was increased to 8 dollars per acre-foot for agricultural water and $26.40 per acre-foot for water extracted for other than agricultural uses. These increases represent the cost of conservation of the local water and were the same as assessed in the previous year by the Santa Clara Valley Water Conservation District. In Zone W-3 an ad valorem tax of 37 cents per 100 dollars of assessed valuation on land only was assessed to pay for the costs of local conservation. In Zones W-3.1, W-3.2, and W-3.3 a ground water charge of 3 dollars per acre-foot for water extracted for agricultural use and $10.40 per acre-foot for water extracted for other than agricultural uses was assessed for the 1968-69 water year. These ground water charges are also to pay the costs of local conservation.

The actual income and expenditures for the 1967-68 water year are given in Table 4. Estimates of the income and expenditures for the 1968-69 and 1969-70 water years are also presented in Table 4. These estimates will serve as the basis of the ground water charges to be levied for the ensuing 1969-70 water year by the District Board of Directors.

Findings

As a result of the investigation summarized herein, the following findings and determinations may be made:

1. The annual water supply surplus (+) or deficiency (-) for the ground water basins of the District for the preceding (1967-68), current (1968-69), and ensuing (1969-70) water years is estimated to be (in acre-feet):

Ground Water Basin	Preceding	Current	Ensuing
Santa Clara Valley	+17,000	+16,000	+21,000
Coyote	- 9,000	0	0
Llagas	-38,000	0	0

2. The long-term accumulated overdraft as of the end of the preceding (1967-68) water year in the Santa Clara Valley Ground Water Basin is estimated to be 678,000 acre-feet, zero in the Coyote Ground Water Basin, and zero in the Llagas Ground Water Basin.

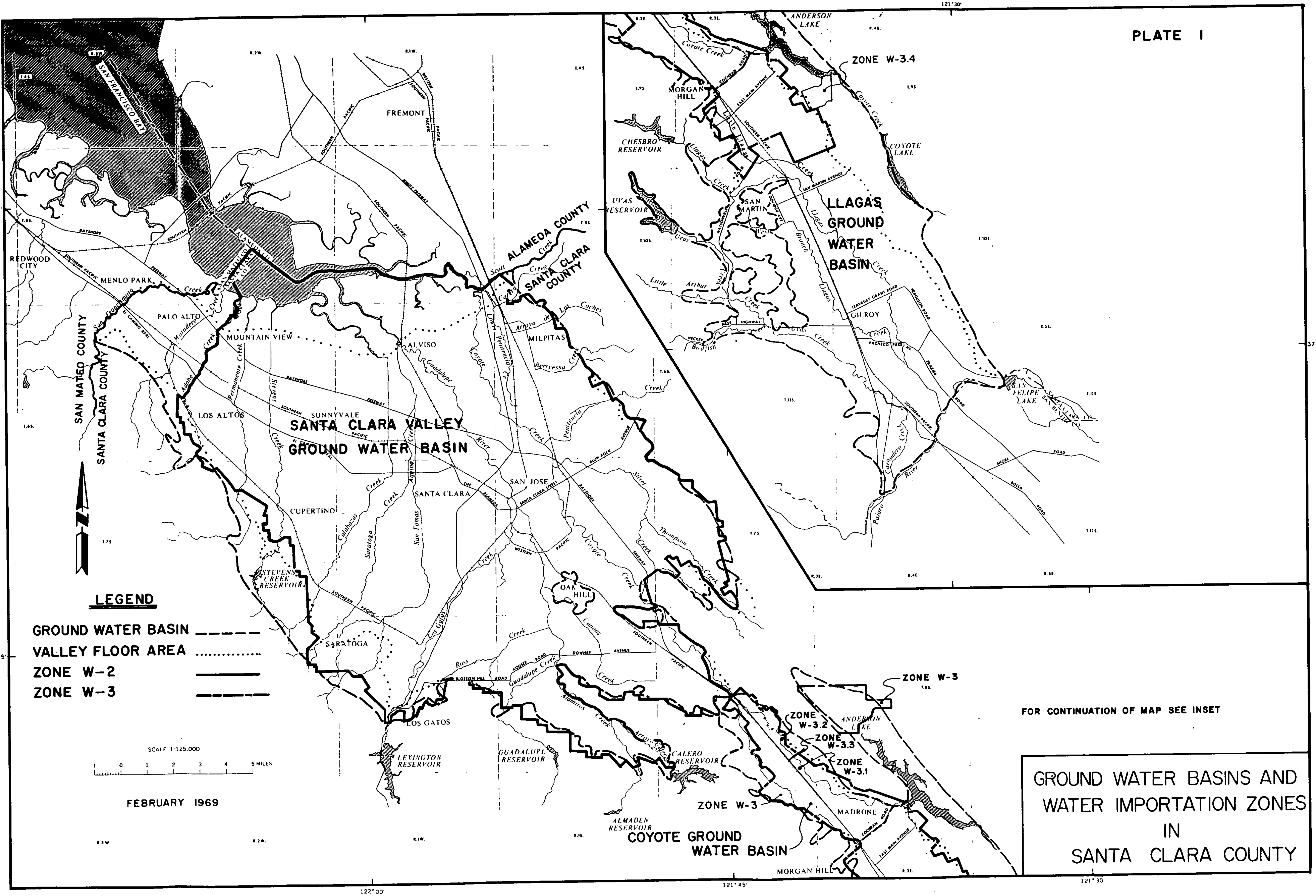
3. The estimated amounts of ground water extracted or to be extracted from the ground water basins of the District for the preceding (1967-68), current (1968-69), and ensuing (1969-70) water years are in acre-feet:

Ground Water Basin	Preceding	Current	Ensuing
Santa Clara Valley	157,000	137,000	132,000
Coyote	15,000	11,000	11,000
Llagas	74,000	54,000	55,000

4. The configuration of the ground water table at the end of the preceding (1967-68) water year is shown on Plate 2, and the change from the previous year is one of limited recovery.

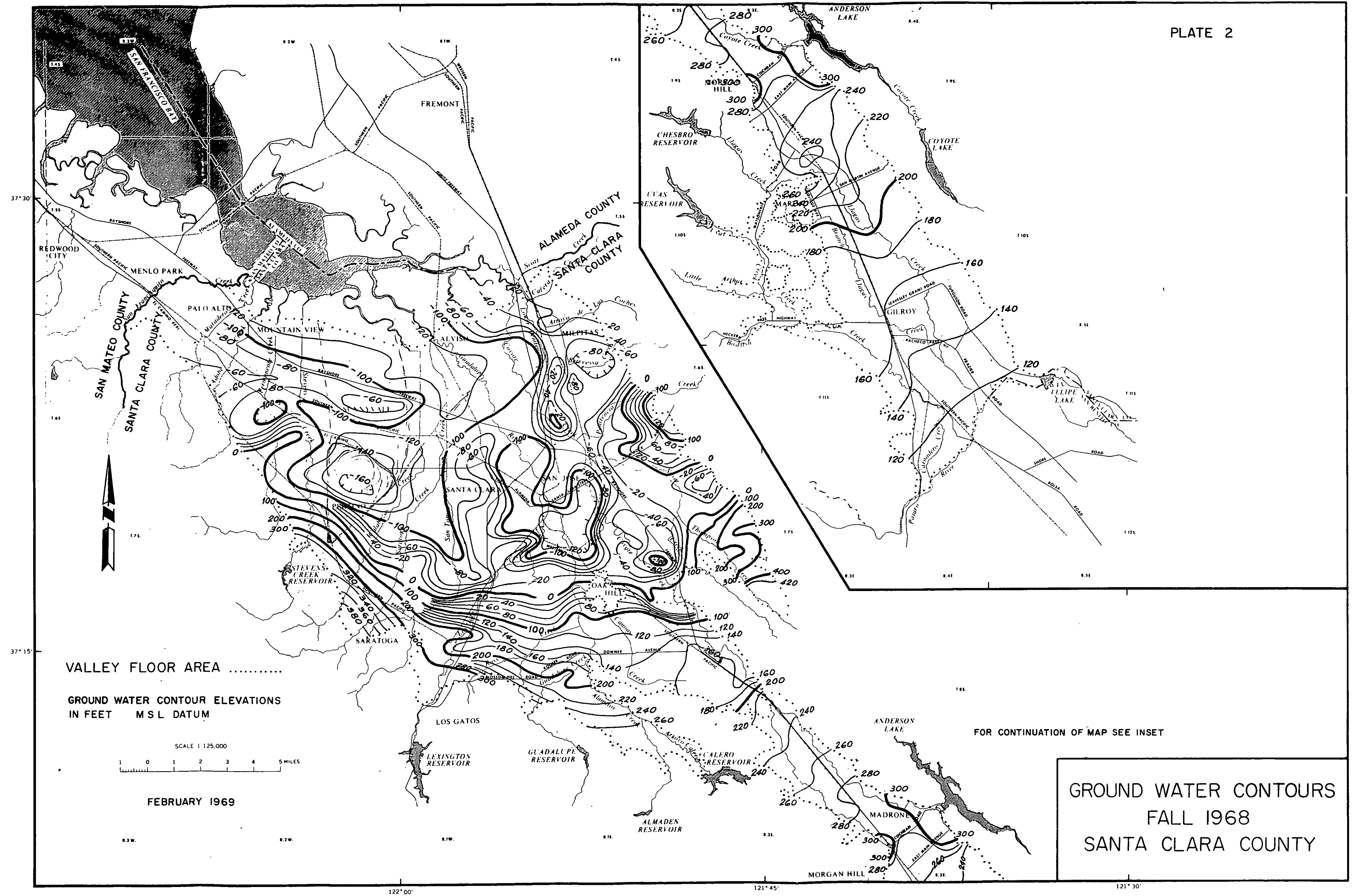
5. The District is obligated by contract to purchase 79,800 acre-feet of imported water from the South Bay Aqueduct in the ensuing (1969-70) water year.

PLATE I



GROUND WATER BASINS AND WATER IMPORTATION ZONES IN SANTA CLARA COUNTY

PLATE 2



FOR CONTINUATION OF MAP SEE INSET

VALLEY FLOOR AREA ....

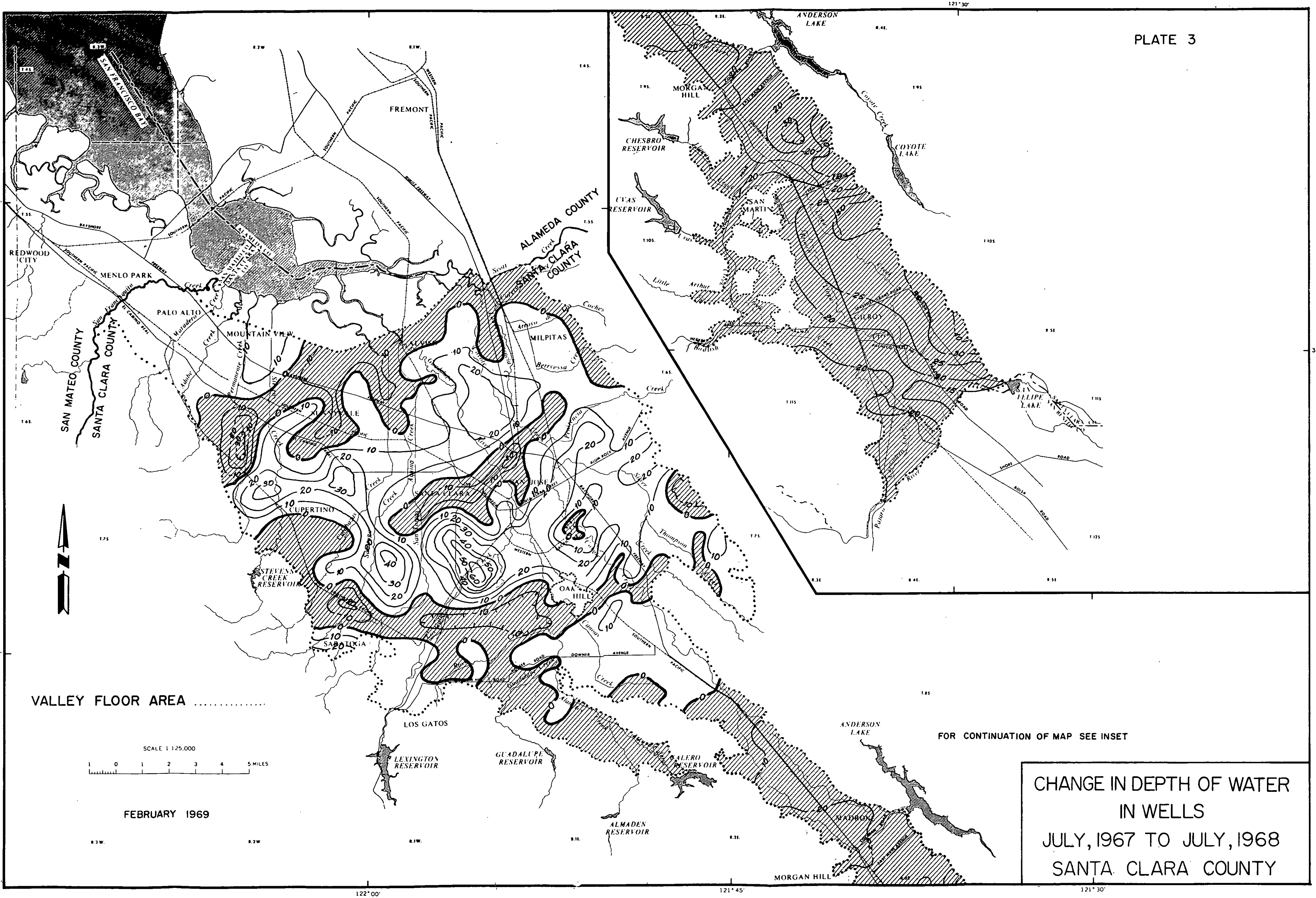
GROUND WATER CONTOUR ELEVATIONS
IN FEET M S L DATUM

SCALE 1:125,000

FEBRUARY 1969

GROUND WATER CONTOURS
FALL 1968
SANTA CLARA COUNTY

PLATE 3



CHANGE IN DEPTH OF WATER IN WELLS JULY, 1967 TO JULY, 1968 SANTA CLARA COUNTY

FEBRUARY 1969